Morphotactic Constraints in the Chichewa Verb Stem
Author(s): Larry M. Hyman and Sam Mchombo
Proceedings of the Eighteenth Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on The Place of Morphology in a Grammar (1992), pp. 350-364

Morphotactic Constraints in the Chichewa Verb Stem

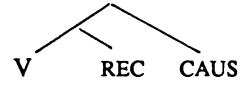
Larry M. Hyman and Sam Mchombo
U.C. Berkeley

A major issue in determining the place of morphology in a grammar concerns the role of "morphotactic constraints".[1] In many languages with complex morphologies, affixes may not be combined freely, but rather are subject to different kinds of sequential constraints. As has been known for some time among Bantuists (e.g. Guthrie 1962), verbal suffixes such as those cited from Chichewa in (1) may occur in different orders with a corresponding meaning difference.

(1)	a.	mang-	V	[verb root]	'tie'
	b.	mang-its-	CAUS	[causative]	'cause to tie'
		mang-ir-	APP	[applicative]	'tie for/with/at'
		mang-an-	REC	[reciprocal]	'tie each other'
		mang-idw-	PASS	[passive]	'be tied'
		mang-ITS-	INT	[intensive]	'tie well'

In (2a), for instance, we see that a causativized reciprocal has the sequence -an-its-, while in (2b) a reciprocalized causative has the sequence -its-an-:

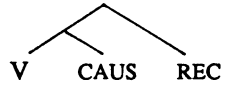
(2) a. [X cause [Y_i tie e.o.$_i$]]



[[[mang] an] its]

'cause to tie each other'

b. [X_i cause [e.o.$_i$ tie Y]]



[[[mang] its] an]

'cause each other to tie'

Such facts are clearly relevant to the issue of establishing the place of morphology within a grammar: Are the reasons for different suffix orders to be found in the semantics, the syntax or the lexicon? To what extent are ordering and cooccurrence constraints a property of the individual morphs themselves? In this paper we shall take a close look at the morphotactic constraints holding between the Chichewa verb suffixes in (2b). We shall focus particularly on cases where the order of suffixes conflicts with what would be expected from compositionality, or scope. Our comprehensive study of suffix combinations in Chichewa reveals a considerably more complex situation than what one is led to believe from studies that cite only some of the possible suffix pairings.

To begin, as observed in (3),

(3)	a.	REC-CAUS	mang-an-its-	'cause to tie each other'
		CAUS-REC	mang-its-an-	'cause each other tie'
	b.	APP-PASS	mang-ir-idw-	'be tied for[*ben*] ~ with[*instr*] ~ at[*loc*]'
		PASS-APP	mang-idw-ir-	'be tied at[*loc*] ~ for[*reason*]'

c.	APP-REC	mang-ir-an-	'tie for each other'	
	REC-APP	*mang-an-ir-		
		mang-an-ir-<u>an</u>-	'tie each other for/with/at'[2]	
d.	REC-INT	mang-an-ITS-	'tie each other well'	(=INT-REC)
	INT-REC	mang-ITSITS-an-	'tie well each other'[3]	(=REC-INT)

four of the ten combinations of two suffixes occur in both orders. Of the remaining six combinations, two of these, in (4), fail to combine in either order.

(4) a.	*REC-PASS	*mang-an-idw-	(*'be each other tied')	
	*PASS-REC	*mang-idw-an-	(*'be tied each other')	
b.	*CAUS-INT	*mang-its-ITS-	('cause to tie well')	
	*INT-CAUS	*mang-ITSITS-its-	('cause well to tie')	

In (4a) the reciprocal and passive cannot combine, because the transitive verb -mang- can only be detransitivized once. In (4b), bimorphemic sequences such as -its-ITS- are ruled out by the Menn and MacWhinney's (1984) Repeated Morph Constraint (RMC): Assuming cyclicity, two morphosyntactic features may not successively be spelled out by the same morph in Chichewa. As in Bantu generally, any morphosyntactic derivation that requires a violation of the RMC is simply blocked.[4] In (5) we present a hypothesis concerning the relationship between causative -its- and intensive -ITS(ITS)-. As seen, the latter not only has a reduplicative allomorphy, but also involves a H tone that is lacking in the corresponding causatives (cf. Mtenje 1986; Kanerva 1989).[5]

(5) a. INTENSIVE → [+reduplication] / ___ suffix

b. INTENSIVE → CAUSATIVE + H tone

In (6) we show that the RMC is not in effect when another suffix intervenes:

(6) a.	*mang-ir-ir-a	'tie for [s.o] at [s.pl.]'	
b.	mang-ir-an-ir-<u>an</u>-	'tie for each other at [s.pl.]'[2]	
c.	mang-ir-idw-	'be tied at [s.pl.]' =	
	mang-idw-ir-	'be tied at [s.pl.]'	
d.	*mang-ir-ir-idw-	'be tied with [sth.] at [s.pl.]'	
	mang-ir-idw-ir-	'be tied with [sth.] at [s.pl.]'	

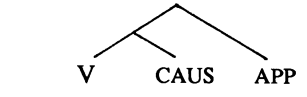
In (6a), although it is semantically reasonable to express both a benefactive and a locative on the same verb, we see that it is not possible to combine two applicative suffixes in sequence—in fact no matter which semantic roles they express. In (6b), however, where reciprocal -an- intervenes between the two applicative morphs -ir-, the verb form is good. Another suffix that may intervene between two applicative morphs is the passive -idw-. In (6c), an applicative -ir- that introduces a locative may optionally appear either before or after the passive suffix -idw-. However, (6d) shows that locative -ir- must follow passive -idw-, if the latter is already preceded by an applicative morph (here introducing an instrument).

We have now covered six of the ten combinations of two suffixes. Those pairs still not accounted for are presented in (7).

(7) a.	CAUS-APP	mang-its-ir-	'cause to tie for (~ with ~ at)'
	*APP-CAUS	mang-ir-its-	'cause for (with/at) to tie'
b.	CAUS-PASS	mang-its-idw-	'be caused to tie'
	*PASS-CAUS	*mang-idw-its-	'cause to be tied' (use CAUS-PASS)
c.	INT-APP	mang-ITSITS-ir-	'tie well for (~ with ~ at)'
	*APP-INT	*mang-ir-ITS-	'tie for (~ with ~ at) well' (=INT-APP)
d.	INT-PASS	mang-ITSITS-idw-	'be tied well'
	*PASS-INT	*mang-idw-its-	'be tied well' (=INT-PASS)

In (7a), we see that independent of the scope, causative -its- must precede applicative -ir-. Thus, while an applicativized causative spells out directly in (8a), we must somehow block the incorrect spellout of a causativized applicative in (8b).

(8) a. [for W [X cause [Y tie Z]]]



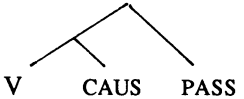
[[[mang] its] ir]

b. [X cause [for W [Y tie Z]]]

*[[[mang] ir] its]

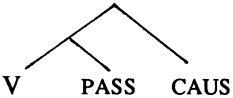
Similarly, in (7b) we see that independent of scope, causative -its- must precede passive -idw-. That is, while a passivized causative spells out directly in (9a), a causativized passive cannot surface as in (9b).

(9) a. [passive [X cause [Y tie Z]]]



[[[mang] its] idw]

b. [X cause [passive [Y tie Z]]]



*[[[mang] idw] its]

Turning to (7c) and (7d), though not related to scope, intensive -ITS- also may not follow either applicative -ir- or passive -idw-. This presumably is due to its identity with the causative morpheme -its- (cf. (5) above).

One possible solution would be to establish negative filters (cf. Muysken 1981) either against the forbidden morph sequences *-ir-its- and *-idw-its- in (10a) or against the corresponding morphosyntactic sequences in (10b).

(10) a.	*-ir-its- / *-ir-ITS-	b.	*APP-CAUS / *APP-INT
	*-idw-its- / *-idw-ITS-		*PASS-CAUS / *PASS-INT

Either way, (11) shows that these negative filters apply only locally, since the suffix orders in (10) are fine when another suffix intervenes, for example, the reciprocal suffix -an-:

(11) a.	*APP-CAUS	*mang-ir-its-	'cause to tie for [s.o.]'
	APP-REC-CAUS	mang-ir-an-its-	'cause to tie for each other'

b.	*APP-INT	*mang-ir-ITS-	'tie for well'
	APP-REC-INT	mang-ir-an-ITS-	'tie for each other well'

The same demonstration is made in (12) with a more complicated example involving the unacceptable sequence *PASS-INT in (12a).

(12) a.	*PI	*mang-idw-ITS-	'be tied well'
b.	*PAI	*mang-idw-ir-ITS-	'be tied well at [s.pl]'
c.	RC	mang-an-its-	'cause to tie each other'
	RCP	mang-an-its-idw-	'be caused to tie each other'
	RCPA(R)	mang-an-its-idw-ir-an-	'be caused to tie e.o. at [s.pl.]'
d.	RCPARI	mang-an-its-idw-ir-an-ITS-	'be caused to tie e.o. at [s.pl.] well'

As seen in (12b), we cannot place an applicative -ir- between the passive and intensive suffixes, because the sequence APP-INT also violates the filters in (10). Instead, in (12c) we first causativize a reciprocal form to derive the sequence -an-its-. The resulting verb form is then passivized, yielding the sequence -an-its-idw-. Now, when this output is applicativized by adding -ir-, we obtain the sequence -an-its-idw-ir-an- by the required doubling of the reciprocal suffix -an-. Finally, (12d) shows that this complex verb can be intensivized, thereby creating a long-distance sequence of passive -idw- plus intensive -ITS- (interrupted by -ir-an-).

There is a serious drawback, however, to negative filters. While the statements in (10) correctly forbid the sequences in question, they do not at the same time capture the fact that the reversed suffix orders are used with the intended meanings. A second statement is thus required in the grammar to indicate, e.g. as in (13), that the order -its-ir- is used in the place of *-ir-its-. Whether stated as a metathesis of morphs, as in (13a), or as a metathesis of morphosyntactic features, as in (13b), the presence of such readjustment rules makes redundant the filters in (10).

(13) a. -ir-its- → -its-ir- (same metathesis with intensive -ITS-).
-idw-its- → -its-idw-

b. {APP, PASS} + {CAUS/INT} → {CAUS/INT} + {APP, PASS}

But is morpheme metathesis required in these cases?

We now attempt an analysis that both saves compositionality and captures the relevant facts in one statement. As in most models, we assume two levels of morphological representation: an abstract (featural) morphosyntactic level vs. a concrete morph level (Anderson, in press; Baker 1990; Halle 1991; Hollenbach 1984; Zwicky 1985, etc.). Let us assume that the spell-out of abstract morphosyntactic features as surface morphs is cyclic and follows scope, i.e. proceeding in a compositional manner in the default case. In order to get the surface constraints in (10), we shall expand McCarthy and Prince's (1990) notion of prosodic circumscription to include cases as in (15) where the spell-out of one morphosyntactic feature requires that a previously assigned morph be marked off or "circumscribed" (see also Hammond 1991).[6]

(15) a. -ir- → < ir > / ___] {CAUS/INT}

b. -idw- → < idw > / ___] {CAUS/INT}

(15a) states that the applicative morph -ir- is marked off when falling within the immediate scope of a CAUS or INT feature. (15b) shows the parallel circumscription of the passive morph -idw-, again when followed by the CAUS or INT feature. Sample derivations are shown in (16).

(16)			
a.	[[mang] APP]		[[mang] PASS]
b.	[[mang - ir]		[mang - idw]
c.	[[mang - ir] CAUS]		[mang - idw] CAUS]
d.	[[mang] CAUS] <ir>		[[mang] CAUS] <idw>
e.	[mang - its] <ir>		[mang - its] <idw>
f.	[mang - its - ir]		[mang - its - idw][7]
	'cause to tie for'		'cause to be tied'

In the derivation on the left, we begin by associating to the APP feature in (16a) the morph -ir- in (16b).[8] We then expand the verb to include the CAUS feature in (16c). By the process in (15a), the applicative morph -ir- is circumscribed in (16d), followed by the spellout of the causative morph -its-, which now directly affixes to the verb root -mang- in (16e). The derivation is completed by bringing the circumscribed morph -ir- back into the verb base, which will then undergo affixation of an inflectional final vowel (e.g. -a). The derivation on the right is exactly parallel, except for the involvement of the passive morph -idw-, which must invoke the circumscription process in (15b).

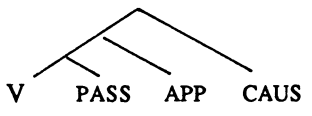
As expected, the derivation in (17) shows that morphemic circumscription will not obtain if another suffix intervenes.

(17)		
a.	[[mang] APP]	
b.	[mang - ir]	'tie for'
c.	[mang - ir] REC]	
d.	[mang - ir - an]	'tie for each other'
e.	[mang - ir - an] CAUS]	
f.	[mang - <u>ir</u> - an - <u>its</u>]	'cause to tie for each other'

In (17a-d) first the applicative and then the reciprocal suffixes are spelled out. In (17e), when the verb is expanded to include the causative feature, the morph -ir- of the base is not circumscribed because the reciprocal morph -an- intervenes. The causative is simply spelled out as -its-.

As a final illustration, consider the derivation in (18) which shows that morphemic circumscription can be iterative:

(18) a.



b. [mang - idw - ir] 'be tied at [s.pl.] ~ for [s.reason]'

c. [[mang - idw - ir] CAUS]

d. [[mang - idw] CAUS] <ir> (circumscription by (15a))
e. [[mang] CAUS] <idw - ir> (circumscription by (15b))
f. [mang - its - idw - ir] 'cause be tied at [s.pl.] ~ for [s.reason]'

The morphosyntactic features PASS and APP of (18a) are spelled out normally in (18b). When the CAUS feature is added in (18c), the applicative morph -ir- is circumscribed in (18d) by (15a). This then feeds the circumscription of the passive morph -idw- in (18e) by (15b). Finally, in (18f), the morphs are reunited.

On the surface, the effect of morphemic circumscription appears to be metathesis. It is significant that the desired result can be obtained by extending prosodic circumscription, which is independently needed for infixation and various base-internal modifications associated with multiplanar morphology.[9] Crucially, we reject approaches such as in (19) which attempt to generate the correct suffix orders in one step: First, in (19a), one might separate linear precedence from immediate dominance in morphology as GPSG does for syntax (and as Fabb 1988 has proposed for English morphology). (19a) is to be read in the following way: The morph -its- must precede either the morph -ir- or the morph -idw-. Assuming the Adjacency Condition of Siegel (1977), the effect would be a strictly local condition on the spell-out of -its- before the other two morphs.

(19) a. linear precedence: -its- $\supset$ { -ir- , -idw- }

b. non-cyclic, non-derivational line-crossing of feature/morph association:

The same effect would be felt in a completely non-derivational approach such as (19b), where the indicated mini-templates instruct the indicated feature sequences to be spelled out with crossing association lines.

The evidence against such single-step spellouts is largely phonological. Since Chichewa does not provide unambigous evidence for cyclic stem phonology, let us consider the data in (20) from nearby Cibemba:

(20)

	UR		MORPHOLOGY		PHONOLOGY		MORPHOLOGY		PHONOLOGY
a.	-lub- 'be lost'	→	-lub-ị- 'lose'	→	-luf-ị-	→	-luf-il-ị- 'lose for/at'	→	-luf-is-ị- (-luf-ish-ị-)
b.	-lil- 'cry'	→	-lil-ị- 'make cry'	→	-lis-ị-	→	-lis-il-ị- 'make cry for/at'	→	-lis-is-ị- (-lish-ish-ị-)

In this language, the causative morph -ị- causes a mutation on a preceding non-nasal consonant (labials become [f], while linguals become [s]). In the examples in (20), causative -ị- is first added to the intransitive verbs 'be lost' and 'cry'. The transitive verbs 'lose' and 'make cry' then undergo consonant mutation. This is followed by suffixing the applicative suffix -il- between the mutated verb root and the causative morph -ị-. As seen, the /l/ of the applicative suffix then undergoes consonant mutation. As shown by Hyman (1991), if the applicative and causative suffixes had been directly spelled out as -il-ị-, there would have been no way to get

the root-final consonants to mutate (especially since the applicative morph -il- does not by itself cause consonant mutation, e.g. -lub-il- 'be lost for/at'). Instead, Cibemba and many other Bantu languages require the spell-out to be cyclic, as we have assumed also for Chichewa.

Let us now address in (21) the doubling of reciprocal -an- after applicative -ir-.

(21) a. mang-ir-an- 'tie for each other'
b *mang-an-ir-
c. mang-ir-an- 'tie each for [s.o.] ~ with [sth.] ~ at [s.pl.] ~ for [s.reason]'
d. mang-an-ir-<u>an</u>- (=(21c))

(21a) shows that reciprocal -an- may follow applicative -ir- with no problem. In (21b), however, we see that the reverse is ungrammatical. One of two things must happen. In (21c) we observe that the order -ir-an- can also be used instead of (21b), i.e. used as an applicativized reciprocal. To handle this, we propose another process of morphemic circumscription in (22).

(22) -an- → < an > / ___] {APP} (optional)

Reciprocal -an- is optionally circumscribed when followed by an applicative. If, on the other hand, the circumscription is not chosen, (21d) shows that -an- must be doubled on the other side of the applicative morph -ir-.

While having parallels in other Bantu languages (e.g. the doubling of causative -ị- in Cibemba discussed by Hyman 1991), doubling represents a rather unusual state of affairs and a challenge. Furthermore, (23) shows that unlike the RMC and morphemic circumscription, doubling is global—in apparent violation both of Siegel's (1977) Adjacency Condition and Williams' (1981) Atom Condition:

(23) a. *mang-<u>an</u>-its-<u>ir</u>-
mang-an-its-ir-<u>an</u>- 'cause to tie each other for ~ with ~ at'
b. *mang-<u>an</u>-its-idw-<u>ir</u>-
mang-an-its-idw-ir-<u>an</u>- 'be caused to tie each other at ~ for [reason]'

The example in (23a) shows that the causative morph -its- is apparently transparent to the -an-ir- problem, and hence doubling of -an- is required. The example in (25b) is even more striking: In this form, when -ir- is spelled out, there are two suffixes, -its- and -idw-, that intervene between it and the preceding -an-. Still, doubling of reciprocal -an- is required.

It is clear that doubling is required whenever an applicative is suffixed to a base that has a reciprocal anywhere in it. Let us attempt the following two-part solution. First, let the reciprocal feature percolate outwards as a feature on the entire base. It is this feature (rather than the internal morph -an-) which conflicts with the outside applicative.[10] Second, we propose in (24) that the applicative and reciprocal spell-out rules apply in that order but constitute a *conjunctive* rule block. In (24a), the applicative is spelled out in the first cycle, where reciprocal spelling cannot apply. On the second cycle, applicative spelling cannot reapply because of the RMC, while reciprocal spelling does apply.

(24) a. [[[mang] APP] REC] 'tie for each other'

Cycle 1:

-ir- APP → -ir-

--- REC → -an-

Cycle 2:

--- APP → -ir- (blocked by RMC)

-an- REC → -an-

b. [[[mang] REC] APP] 'tie each other for ~ with ~ at'

Cycle 1:

--- APP → -ir-

-an- REC → -an-

Cycle 2:

-ir- APP → -ir-

-an- REC → -an- (triggered by percolated REC)

In (24b), applicative spelling cannot apply on the first cycle, but reciprocal spelling does. On the second cycle, applicative spelling applies—followed by a second spell-out of the reciprocal morph -an-. Since the reciprocal feature percolates, non-local re-spelling of the morph -an- will occur even when there is an intervening suffix, as we have seen.[11]

Continuing with this problem of doubling, (25) shows that one might expect to get multiple respellings of reciprocal -an-. In these forms we begin with -mang-an- 'tie each other'. In (25a) we have attempted to express more than one applicative, with respelling of -an- after each one. The result is not very acceptable.

(25) a. mang-an-ir-an- 'tie each other for [s.o.]'

?*mang-an-ir-an-ir-an- 'tie each other for [s.o.] with [sth.]'

*mang-an-ir-an-ir-an-ir-an- 'tie each other for [s.o.] with [sth.] at [s.pl.]'

b. ?mang-an-ir-an-its-ir-an- 'cause to tie e.o. for [s.o.] with [sth.]'

'cause to tie e.o. with [sth.] at [s.pl.]'

?mang-an-ir-an-its-ir-an-ITSITS-ir-an- 'cs. tie e.o. for [s.o.] with [sth] well at [s.pl]'

'cs. tie e.o. with [sth] at [s.pl.] well for [s.reason]'

There are two possible explanations for this. First, perhaps there is a dislike of multiple -an-ir- sequences. Or, second, perhaps there is a dislike of repeated applicative FEATURES. If the doubled morphs are invisible, the unacceptable forms in (25a) would be violations of the RMC. In other words, the applicative morphemes in (25a) are actually adjacent to each other, just as they would be if there were no -an- doubling. In support of this second view, note in (25b) that the forms are better when a causative or intensive morph occurs between a doubled -an- and the following applicative -ir-. Of course, it is conceivable that this may also have something to do with the nature of the applicative itself, to which we now turn.

In (26) we illustrate the functions that the applicative may have when added to a verb such as -mang- 'tie'.[12]

(26)	a.	mang-ir-a mchômbo	'tie for Mchombo'[13]	[benefactive]
	b.	mang-ir-a chingwe	'tie with a rope'	[instrumental]
	c.	mang-ir-a m-nkhalăngo	'tie in the forest'	[locative]
	d.	mang-ir-a ndalâma	'tie for money'	[circumstantial]

What is of interest for the study of morphotactic constraints is that the applicative and passive suffixes have different orders according to the function of the applicative (cf. Alsina, in press): If the applicative introduces a benefactive, goal or instrument, -ir- must precede the passive morph -idw-. If it introduces a circumstantial, -ir- must follow -idw-. Finally, if it introduces a locative, either order is acceptable—without any semantic or grammatical difference that we have been able to discover.[14]

These facts are illustrated in the sentences in (27)-(30). The benefative and instrumental data in (27a) and (28a) with -ir-idw- should be contrasted with the circumstantial data with -idw-ir- in (30a). In (29) we see that independent of which role is made the subject of the passive, both of the orders, -ir-idw- and -idw-ir-, can occur when the applicative introduces a locative. The question is why.

(27) Applicative [benefactive] + Passive

a.	Mchómbó a-na-máng-ír-idw-á nkhûni	'Mchombo was tied firewood'
	*Mchómbó a-na-máng-ídw-ir-á nkhûni	
b.	*nkhúní zi-na-máng-ír-idw-á Mchômbo	('firewood was tied for Mch.')
	*nkhúní zi-na-máng-ídw-ir-á Mchômbo	[*PATIENT subject w/BEN]

(28) Applicative [instrumental] + Passive

a.	chingwe chi-na-máng-ír-idw-á nkhûni	'a rope was used to tie firewood'
	*chingwe chi-na-máng-ídw-ir-á nkhûni	
b.	*nkhúní zi-na-máng-ír-idw-á chingwe	('firewood was tied with a rope')
	*nkhúní zi-na-máng-ídw-ir-á chingwe	[*PATIENT subject w/INSTR]

(29) Applicative [locative] + Passive

a.	m-nkhalangó mu-na-máng-ír-idw-á nkhûni	'in forest was tied firewood'
	m-nkhalangó mu-na-máng-ídw-ir-á nkhûni	
b.	nkhúní zi-na-máng-ír-idw-á m-nkhalăngo	'firewood was tied in forest'
	nkhúní zi-na-máng-ídw-ir-á m-nkhalăngo	

(30) Applicative [circumstantial] + Passive

a.	*nkhúní zi-na-máng-ír-idw-á ndalâma	
	nkhúní zi-na-máng-ídw-ir-á ndalâma	'firewood was tied for money'
b.	*ndalámá i-na-máng-ír-idw-á nkhûni	('[for] money was tied firewood')
	*ndalámá i-na-máng-ídw-ir-á nkhûni	[*CIRCUM subject of passive]

For this purpose, Alsina (in press) presents a model which invokes the familiar thematic role hierarchy in (31).

(31) agent > benefactive > goal > instrument > patient > locatives > circumstantials

Applicative ARGUMENTS (participants) — Applic. ADJUNCTS (settings)

The roles that we have designated as "applicative arguments" result in an applicative -ir- that precedes passive -idw-, while those that we have identified as "applicative adjuncts" result in an applicative -ir- that follows passive -idw-. As seen, locatives are intermediate in the hierarchy, and thus can pattern either with applicative arguments or applicative adjuncts. (As mentioned, we have not found that the order of locative -ir- varies according to the semantic or grammatical properties of the locative that it introduces.)

There is in fact additional reason to believe that the schematic hierarchy in (31) is involved in determining suffix morphotactics in Chichewa. We have mentioned scope as determining the default ordering of suffixes. What about cases that do not conform? For example, as illustrated again in (32), causative -its- must precede applicative -ir- even though in most verb forms the scope is exactly opposite:[15]

(32) a. uk-a 'wake up'
b. uk-ir-a 'rebel against' (= 'wake up' + APP)
c. *uk-ir-its-a 'cause to rebel against'
d. uk-its-ir-a 'cause to rebel against' (also = 'wake up [s.o.] for (~ with ~ at)')

When the intransitive verb uk-a 'wake up' in (32a) is applicativized in (32b), the resulting idiomatic meaning is 'rebel against'. According to scope considerations, when (32b) is causativized, we should get the suffix order in (32c). Instead, as seen, the correct order is (32d). Thus, even in cases where a root+suffix combination must be listed as a lexical entry, morphemic circumscription can separate the two parts, as in (32d). Which brings us to the essential question: why? Why does the causative suffix have to precede an adjacent applicative suffix?

As indicated in (33a), the thematic hierarchy partially accounts for suffix orders that depart from what we would expect from scope. A second principle seems to be that suffixes that target roles higher on the thematic hierarchy should precede suffixes that target roles lower on the hierarchy. Since the causative introduces an agent, the highest thematic role, it will tend to come first. Since the applicative introduces benefactives, goals and instruments—and since the reciprocal tends to realize a patient argument—applicative - · · should precede reciprocal -an-. Unfortunately, an applicative should follow a reciprocal when it introduces a locative or a circumstantial—lowest on the hierarchy—but only optionally does. It seems that the ordering properties have become fixed according to the prototypical functions of each of the affixes. This leaves only the intensive orders in (33b).

(33) a. ir [ben] - CAUS [agt] → CAUS < ir > (agent ⊃ benefactive, etc.)
idw [pat] - CAUS [agt] → CAUS < idw > (agent ⊃ patient, etc.)
an [pat] - APP [ben] → APP < an > (benefactive ⊃ patient)

b. ir [var.] - INT [adverbial] → INT < ir > (adverbial ⊃ benefactive, etc.)
idw [var.] - INT [adverbial] → INT < idw > (adverbial ⊃ patient, etc.)

Since the intensive suffix has an adverbial function, we assume that it has widest scope, and yet it must precede both the applicative in all of its functions as well as

the passive.[16] Here again we apparently are dealing with the shared morphology of the intensive with the causative, the latter of which comes early by virtue of its being agentive. If this is correct, then something like the thematic hierarchy plays an important role in surface morphology as well as in syntax.

To summarize, although we have suggested that scope serves as a default for determining suffix ordering, other variables that may override scope include morphemic circumscription and the thematic hierarchy. In addition, the RMC plays an important role not only in blocking multiple spellings of the same morph, but potentially also in accounting for the doubling of reciprocal -an-. This latter phenomenon differs from everything else we surveyed in providing the only truly non-local effect within the Chichewa verb stem—and hence a serious challenge to current theories of morphology.[17]

The above having been said, we would like to conclude with some rather perplexing material that is not consistent with the cyclic spell-out hypothesis. Consider the morphosyntactic representation in (34a):

(34) a. [[[[mang] REC] APP] CAUS] 'cause to tie e.o. with'
b. *mang-an-ir-its-
c. *mang-ir-an-its- (=ungrammatical with intended scope)
d. ?mang-an-ir-<u>an</u>-its-
e. mang-an-its-ir-<u>an</u>-
mang-its-an-ir-<u>an</u>-
mang-its-ir-an-

As seen in (34b), cyclic spell-out of the REC, APP and CAUS features produces an ungrammatical output: both -an-ir- and -ir-its- are ungrammatical sequences. The crucial point is that if the derivation is cyclic in nature, it should be possible to fix up *-an-ir- *before* the spell-out of -its-. However, (34c) shows that it is not possible to spell out REC-APP as -ir-an- (by optional morphemic circumscription in (22)) when this sequence is in turn followed by -its-. In (34d) we see that doubling of -an- is at best marginal when -an-ir-an- is followed by -its-. On the other hand, the suffix orders in (34e) are all possible realizations of (34a): -its- may appear between -an- and -ir- (with doubling of -an- after -ir-); -its- may appear before the -an-ir-an- sequence or -its- may appear before the -ir-an- sequence that derives from REC-APP by morphemic circumscription in (22). Though not pointed out earlier, for expository reasons, the form in (2b), repeated as (35a), is actually ambiguous:

(35) a. mang-its-an- 'cause each other to tie; cause to tie each other'
b. mang-an-its- 'cause to tie each other' (*'cause each other to tie')

While the sequence -its-an- is ambiguous in scope, the opposite order -an-its- in (35b) has only one scope. Following the approach taken earlier, we apparently need to set up another optional case of morphemic circumscription:

(36) -an- → < an > / ___] {CAUS/INT} (optional)

In the last two examples in (34e), *two* instances of morphemic circumscription have applied: one marking off -ir- by (15a), one marking off -an- by (36).

What the data in (34) show is that the position of the causative suffix -its-

must be established before any attempt is made to deal with the -an-ir- problem. Again, this is consistent with its higher position on the thematic hierarchy, but in this case the result is an anti-cyclic spellout: It would appear that the entire morphosyntactic representation in (34a) is available from the start and that different features are spelled out in an order which, as we have seen, is partially influenced by the thematic hierarchy. Or, stated slightly differently, the spell-outs are weighted according to their position on that hierarchy, such that the first issue is to determine where the causative suffix will be. Throughout Bantu there is an unmistakable tendency for causative spelling to be early. The rest of the suffixes seem to accommodate the causative, rather than the other way around. In Cibemba, as we saw in (20), causative -i- will always be spelled out before applicative -il-, even though the latter *precedes* -i- on the surface. While the early spelling of causative -i- in (20) provides evidence for a cyclic derivation in Cibemba, the early spelling of causative -its- in (34e) provides evidence for anti-cyclicity in Chichewa. Needless to say, the special status of the causative (and, parasitically, the intensive) provides an important issue for future research into the morphotactic constraints that obtain within the verb stem of different Bantu languages.

---

[1]Over the course of the development of this paper, we have had the fortune of receiving valuable input from a number of linguists at Berkeley, particularly from those attending the Hyman/Rhodes Phonology-Morphology graduate course in Fall 1991 and Kay Syntax Seminar in Spring 1992. We would like especially to thank Sharon Inkelas, Paul Kay, Jean-Pierre Koenig, Richard Rhodes, and Josephat Rugemalira for their extensive input and helpful responses.

[2]As discussed further below, reciprocal -an- must be spelled out a second time when added to a base that has an applicative in it. In this paper, all instances of doubled -an- are underlined.

[3]The intensive suffix -ITS- (capitalized to distinguish it from causative -its-) must be reduplicated to -ITSITS- when followed by another derivational suffix. Note in the examples in (3d) that the two orders are synonymous and hence do not reflect a difference in scope (cf. note 16).

[4]As a result, there is no way to express an intensivized causative or a causativized intensive; nor is there any way to express two applicative arguments of the same verb if the sequence -ir-ir- is required: *nkúní zimene ti-na-máng-ír-ir-a mchómbó chingwe 'the firewood that we tied up for Mchombo with a rope'. Although Menn and MacWhinney (1984) show cases where the RMC results in haplology (cf. Stemberger 1983) or allomorphy, most Bantu cases which involve the morphological expression of argument structure result in blocking (or what Menn and MacWhinney call "avoidance"). Thus, with respect to the applicative, one -ir- cannot "register" more than one thematic role. The one exception is that a lexicalized causative may be causativized a second time, e.g. dy- 'eat', dy-ets- 'feed', dy-ets-ets- 'cause to feed'. We assume in these cases that the inner brackets of [[dy] ets] are not visible to the productive causative and other suffixes. We suspect that the RMC conflates more than one phenomenon. In some languages one cannot suffix a morph to a base whose final is partially similar to it. In Chichewa, intensive -ITS- cannot be suffixed to any base that ends in [ts], e.g. it may not suffix to the exceptional causative -uts- 'wake up [tr.]' (< -uk- 'wake up [intr.]') to derive *uts-ITS-. It may on the other hand be added to the exceptional causative -opsy- 'frighten' (< -op- 'be afraid') to yield opsy-ETS- 'frighten well'. While this also explains why we cannot get *-its-ITS-, it does not account for why *-ITSITS-its- is impossible (where the intensive precedes the causative and is hence doubled).

[5]For this reason we have chosen a toneless verb root mang- 'tie'. With an inflectional final vowel -a and in non-phrase final position, the causative form mang-its-a is still toneless, while the final H of form mang-ITS-á 'tie well' is due to the intensive suffix -ITS-. Note that (5b) is a "rule of referral" in Zwicky's (1987) sense (cf. Cairstairs' 1987 notion of "takeover").

[6]The standard example of prosodic circumscription comes from Ulwa (Nicaragua), where the construct state is created by circumscribing the first foot of a word and then inserting -ka- (which thus surfaces as an infix) (cf. McCarthy and Prince 1990; Lombardi and McCarthy 1991).

[7]As indicated above, this can also mean 'be caused to tie', from [[[mang] CAUS] PASS].

[8]Note that we consider "spell-outs" not to be rewrite rules, but rather statements of assignment or association, e.g. the morphemic feature APP becomes associated with the surface morph -ir-, etc.

[9]Hammond (1991) also introduces the notion of morphemic circumscription, particularly to handle so-called bracketing paradoxes.

[10]Muysken (1988) also discusses some non-local effects in Quechua that raise similar problems.

[11]Needless to say, we are concerned about this weakening of the Adjacency Condition. We have not been able to find any convincing explanation for why it should be the reciprocal suffix -an- that has this property in Chichewa. As documented by Hyman (1991), the causative morpheme -ị- doubles after a reciprocal in Cibemba. Why this should be so is also not clear. We would ideally like to avoid two undesirables: (i) allowing all outside suffixes to see any inside suffix (adjacent or not); (ii) allowing all features to percolate and hence be successively available to all outside suffixes. Note, finally, that there is a slightly different way to achieve the doubling of -an-: We could say that the APP feature is spelled out as -ir-an- if it attaches to a base that is [+REC]; otherwise it spells out as -ir-. In this approach it becomes an accident that the "allomorph" that is used after a [+REC] base just happens to have an extra -an- in it. That is, it would have been no less complex to spell out the APP as -ir-ik- or even -ik-at-, with one or both VC sequences having no relation to APP -ir- or REC -an-. It is not clear how crucial it is that the second part of -ir-an- is identical to REC -an-, though a similar relation exists in Cibemba, where CAUS + REC is realized as -ị-an-ị- (Hyman 1991). The important fact to capture about -an-ir-an- is that the sequence -ir-an- counts as one "cycle", i.e. does not involve a second abstract REC marking on the verb.

[12]The major function missing is goal, e.g. bwer-ets- 'bring' (< 'cause to come'), bwer-ets-er- 'bring to'.

[13]Technically, a benefactive (rather than instrumental) reading is most likely when there is an overtly expressed patient, e.g. 'the firewood that they tie for Mchombo'.

[14]We have tested numerous properties of locative applicatives against the two orders -ir-idw- and -idw-ir-. In almost every case, both orders are acceptable. The one exception to this statement concerns pairs of sentences such as the following:

galú a-na-í-thámang-its-idw-ir-â = mo 'the dog was chased into it' (-i- 'it' < nyŭmba 'house')
?galú a-na-í-thámang-its-ir-idw-â = mo

At present, we have no explanation for this difference in judgment.

[15]A typical example might be imb-its-ir- (< imb- 'sing') which clearly is interpretable first as 'cause to sing to' (with the APP having scope over the CAUS), rather than 'cause on behalf of [s.o.] to sing'. For different scopes, consider also the ambiguity of the form -lir-its-ir- (< -lir- 'cry'):

[with Z [X cause [Y cry]]] → [[[lir] CAUS] APP] -lir-its-ir- 'make cry with [instr]'

[X cause [for Z [Y cry]]] → [[[lir] APP] CAUS] -lir-its-ir- 'make cry for [s.o.]'

[X cause [Y cry for Z]]] → [[[lir] APP] CAUS] -lir-its-ir- 'make cry for [sth]'

In the first representation, the applicative introduces an instrument (e.g. ndodo 'stick') used to make Y cry. In the second representation, the applicative introduces a benefactive for whom X has made Y cry. Finally, in the third representation, the applicative introduces a thing which Y is crying for (i.e. wants).

[16]The adverbial and wide scope nature of the intensive is further demonstrated by two additional facts. First, intensive -ITS(ITS)- is the only suffix that cannot occur in verb stem reduplication, e.g. mang-a.mang-a 'tie repeatedly', mang-its-a.mang-its-a 'cause to tie repeatedly' etc. vs. *mang-ITS-a.mang-ITS-a [with H tone]. We attribute this to the semantic markedness that would result: Since mang-ITS-a means 'tie well' in the sense of tie tightly or tie securely, *mang-ITS-a.mang-ITS-a would mean 'tie tightly repeatedly', etc.) Second, there are cases where -ITSITS- cannot be followed by a sequence of two suffixes: *mang-ITSITS-an-its- 'cause to tie each other well' (vs. mang-its-an-ITS- 'cause each other to tie well'); *mang-ITSITS-ir-idw- 'be tied well with', etc. Thus, if forms like mang-ITSITS-ir- 'tie well for', mang-ITSITS-an- 'tie each other well' and mang-ITSITS-idw- 'be tied well' are to be accounted for by morphemic circumscription, it cannot be iterative in the way we saw for -its- in (20).

[17]Not addressed at all in this paper, is the potential relevance of the RMC, morphemic circumscription and morph doubling to the debate over whether morphemes are "rules" or "things" (see Anderson, in press; Janda 1983). The above phenomena appear to single out morphs, hence things, although we have tried to express the relevant facts in terms of rules wherever possible. It may turn out to be that morphemes are considerably more than things OR rules (see Rhodes 1993).

REFERENCES

Alsina, Alex. In press. Where's the mirror principle? In W. Chao and G. Horrocks (eds), *Levels, principles and processes*. De Gruyter.

Anderson, Stephen R. In press. *A-morphous morphology*. Cambridge U. Press.

Baker, Mark. 1990. Pronominal inflection and the morphology-syntax interface.*CSL* 26.

Carstairs, Andrew. 1987. *Allomorphy in inflexion*. London: Croom Helm.

Fabb, Nigel. 1988. English suffixation is constrained only by selectional restrictions. *Natural Language and Linguistic Theory* 6.527-539.

Guthrie, Malcolm. 1962. The status of radical extensions in Bantu languages. *Journal of African Languages* 1.202-220.

Halle, Morris. 1991. Distributive morphology. Paper presented at the Conference on Features and Domains, University of Illinois, Champaign-Urbana.

Hammond, Michael. 1991. Morphemic circumscription. In Geert Booij and Jaap van Marle (eds), *Yearbook of Morphology*, 195-209. Dordrecht: Kluwer.

Hollenback, Barbara. 1984. *The phonology and morphology of tone and laryngeals in Copala Trique*. Ph.D. dissertation, University of Arizona.

Hyman, Larry M. 1991. Cyclic phonology and morphology in Cibemba. To appear in Jennifer Cole (ed.), *Features and Domains*. C.S.L.I.

Janda, Richard. 1983. "Morphemes" aren't something that grows on tress: morphology as more the phonology than the syntax of words. *Papers from the CLS parasession on the interplay of phonology, morphology and syntax*, 79-95.

Kanerva, Jonni. 1989. *Focus and phrasing in Chichewa phonology*. Ph.D. dissertation, Stanford University.

Lombardi, Linda and John McCarthy. 1991. Prosodic circumscription in Choctaw morphology. *Phonology* 8.37-71.

McCarthy, John J. and Alan Prince. 1990. Foot and word in prosodic morphology: the Arabic broken plural. *Natural Language and Linguistic Theory* 8.209-283.

Menn, Lise and Brian MacWhinney. 1984. The repeated morph constraint. *Language* 60.519-541.

Mtenje, Al D. 1986. *Issues in the nonlinear phonology of Chichewa*. Ph.D. dissertation, University College London.

Muysken, Pieter. 1981. Quechua word structure. In Frank Heny (ed.), *Binding and filtering*, 279-327. Cambridge, Mass.: M.I.T. Press.

Muysken, Pieter. 1988. Affix order and interpretation: Quechua. In Martin Everaert et al (eds), Morphology and modularity, 259-279. Dordrecht: Foris.

Rhodes, Richard. 1983. What is a Morpheme? A View from Construction Grammar. This volume.

Siegel, Dorothy. 1977. The adjacency constraint and the theory of morphology. NELS 8.189-197.

Stemberger, Joseph P. 1983. Morphological haplology. *Language* 57.791-817.

Williams, Edwin. 1981. On the notions 'lexically related' and 'head of word'. *Linguistic Inquiry* 12.245-274.

Zwicky, Arnold. 1985. How to describe inflection. *BLS* 11.372-386.
Zwicky, Arnold. 1987. French prepositions: no peeking. *Phonology* 4.211-227.